

New pages 3 and 3a as amended February 25, 2005

... a valve member would have potentially life-threatening consequences because this valve member could be sucked deep into the lungs with the inhalation flow.

Inhalation therapy devices that are equipped with a valve are known in the prior art. These valves are used to direct the air flow within an inhalation therapy device so that the air flows in accordance with the function of the inhalation therapy device. An aerosol generator emits an aerosol into a nebulizer chamber. This aerosol is entrained by the inhalation air flow and applied within the patient as a result of inhalation. An inhalation valve thereby prevents the aerosol from being released into the environment, for example owing to a lack of air flow, such as during pauses in breath or during exhalation processes with a reversed air flow, in that the valve only permits air to flow from the outside into the nebulizer chamber. Exhalation valves are also used, which serve to reduce overpressure whenever the patient exhales into the inhalation therapy device by releasing exhalation air into the environment, or which serve to prevent the exhalation air from flowing via the inhalation path. The valves (inhalation valve and exhalation valve) are, moreover, also intended to prevent exhalation air from being misdirected and the medicament from being entrained out of the inhalation therapy device into the environment.

Furthermore, a portable nebulizer chamber for an inhaler is known from US 6,039,042, in which a mouthpiece can be removed from a nebulizer chamber, with the valve seat being located on the nebulizer chamber and the valve member being attached to the mouthpiece.

Moreover, an inhalation nebulizer is known from DE 199 53 317 C1, in which a valve member and a valve seat are attached to a lid that can be removed from an inhalation

nebulizer, with both the valve member and the valve seat being located on the lid.

In addition, a nebulizer distributor is known from US 4,333,450, in which a nebulizer comprising a nebulizer chamber is described, said nebulizer being provided with a lid to which a valve member is attached that, in a closed stated, lies on a valve seat arranged on the nebulizer housing.

These valves of inhalation therapy devices according to the prior art are either easily detachable, in which case they do, however, contain parts that could be easily swallowed by the patient if they are not secured properly, or they can be taken apart and reassembled only with a great deal of time and effort, which makes handling far from simple and often results in the loss of the characteristic that the valve can be cleaned in a simple manner. As a rule, the critical areas of a valve in terms of contamination in the region of the seal seat or an ...

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1. An inhalation therapy device (1) comprising
 - a nebulizer chamber (2),
 - an aerosol generator (3) arranged such as to emit a generated aerosol (4) into said nebulizer chamber (2),
 - at least one opening (5) in a wall (6) of said nebulizer chamber (2), and
 - at least one valve (7) arranged on said at least one opening (5) in said wall (6) of said nebulizer chamber (2),

wherein said valve comprises:

- a valve seat (22),
- a resilient valve member (40) and
- a valve member positioning means (11),

said valve member positioning means (11) being movable, relative to said valve seat (22) and said valve member (40), out of a first position and into a second position such that in the first position, said valve member (40), in a flow-free state, is positioned on said valve seat (22) by said valve member positioning means (11) and, in the second position, said valve member (40) is spaced apart from said valve seat (22),

characterized in that

at least two of the parts valve seat (22), valve member (40) and valve member positioning means (11) are injection-moulded as a single part.

2. The inhalation therapy device according to claim 1, characterized in that the spacing apart is achieved by the fixing of the valve member (40).
3. The inhalation therapy device according to one of claims 1 or 2, characterized in that said valve member (40) is attached in the vicinity of or to said valve member positioning means (11).
4. The inhalation therapy device according to one of claims 1 or 2, characterized in that said valve member (40) is attached in the vicinity of or to said valve seat (22).
5. The inhalation therapy device according to one of the preceding claims, characterized in that said valve member (40) is positioned in a pre-tensioned manner on said valve seat (22).
6. The inhalation therapy device according to one of the preceding claims, characterized in that the pre-tension is produced by bending said valve member (40).
7. The inhalation therapy device according to claim 6, characterized in that said valve seat (22) has a curved, rounded or sloping design so as to bend said valve member (40) positioned on said valve seat to produce the pre-tension.
8. The inhalation therapy device according to one of the preceding claims, characterized in that a portion (20) of said wall (6), in which said opening (5) is disposed, is movable relative to said nebulizer chamber (2).

9. The inhalation therapy device according to claim 8, characterized in that the movable portion of said wall (6) is designed as a lid (20) of said nebulizer chamber (2).
10. The inhalation therapy device according to claim 9, characterized in that said lid (20) is attached in a fold-down manner to a stationary part (10) of said nebulizer chamber (2).
11. The inhalation therapy device according to claim 8, 9 or 10, characterized in that said movable portion (20), in particular said lid, is attached in a fold-down manner by means of a film hinge (31).
12. The inhalation therapy device according to claim 11, characterized in that said film hinge (31) is bi-stable.
13. The inhalation therapy device according to one of claims 8 to 12, characterized in that said valve seat (22) is provided on said movable portion (20), in particular on a or said lid, and said valve member positioning means (11) is provided on a or said stationary part (10) of said nebulizer chamber (2).
14. The inhalation therapy device according to one of claims 8 to 12, characterized in that said valve member positioning means (11) is provided on said movable portion (20), in particular on a or said lid, and said valve seat (22) is provided on a or said stationary part (10) of said nebulizer chamber (2).
15. The inhalation therapy device according to one of the preceding claims, characterized in that said movable portion (20), in particular on a or said lid, can be

locked in a closed state by means of at least one snap connection (32, 33).

16. The inhalation therapy device according to one of the preceding claims, characterized in that the parts valve seat (22), valve member (40) and valve member positioning means (11) are injection-moulded as a single part from different materials.
17. The inhalation therapy device according to one of the preceding claims, characterized in that the parts valve seat (22), valve member (40) and/or valve member positioning means (11) are produced in a two-component injection-moulding process.
18. The inhalation therapy device according to one of the preceding claims, characterized in that said valve member (40) is essentially made of a softer material than said valve seat (22) and/or said valve member positioning means (11).
19. The inhalation therapy device according to one of the preceding claims, characterized in that said valve member (40) is essentially made of silicone rubber or thermoplastic elastomer.
20. The inhalation therapy device according to one of the preceding claims, characterized in that said valve member (40) is essentially made of a harder material than said valve seat (22) and/or said valve member positioning means (11).
21. The inhalation therapy device according to one of the preceding claims, characterized in that said valve seat (22) comprises a circumferential sealing lip (21).

22. The inhalation therapy device according to one of the preceding claims, characterized in that said valve (7) is an inhalation valve or an exhalation valve.

23. An inhalation therapy device (1) comprising

- a nebulizer chamber (2) having a stationary part (10),
- an aerosol generator (3) arranged such as to emit a generated aerosol (4) into said nebulizer chamber (2),
- at least one opening (5) in a wall (6) of said nebulizer chamber (2), and
- at least one valve (7) arranged on said at least one opening (5) in said wall (6) of said nebulizer chamber (2),

wherein said valve comprises:

- a valve seat (22) and
- a resilient valve member (40)

said valve seat (22) being moveable, relative to said valve member (40), out of a first position and into a second position such that in the first position, said valve member (40), in a flow-free state, is positioned on said valve seat (22) and, in the second position, said valve member (40) is spaced apart from said valve seat (22),

characterized in that a portion (20) of said wall (6) is movable relative to said nebulizer chamber (2), and

that at least two of the parts valve seat (22), valve member (40) and movable portion (20) or stationary part (10) are injection-moulded as a single part.

24. The inhalation therapy device according to claim 23, characterized in that said opening (5) is disposed in said movable portion (20) of said wall (6).
25. The inhalation therapy device according to claim 23 or 24, characterized in that the movable portion of said wall (6) is designed as a lid (20) of said nebulizer chamber (2).
26. The inhalation therapy device according to claim 25, characterized in that said lid (20) is attached in a fold-down manner to a stationary part (10) of said nebulizer chamber (2).
27. The inhalation therapy device according to claim 24, 25 or 26, characterized in that said movable portion (20), in particular said lid, is attached in a fold-down manner by means of a film hinge (31).
28. The inhalation therapy device according to claim 27, characterized in that said film hinge (31) is bi-stable.
29. The inhalation therapy device according to one of claims 23 to 28, characterized in that said valve seat (22) is provided on said movable portion (20), in particular on a or said lid, and said valve member (40) is provided on said stationary part (10) of said nebulizer chamber (2).
30. The inhalation therapy device according to one of claims 23 to 28 characterized in that said valve member (40) is provided on said movable portion (20), in particular on a or said lid, and said valve seat

(22) is provided on said stationary part (10) of said nebulizer chamber (2).

31. The inhalation therapy device according to one of claims 23 to 30, characterized in that said valve member (40) is positioned in a pre-tensioned manner on said valve seat (22).
32. The inhalation therapy device according to one of claims 23 to 31, characterized in that the pre-tension is produced by bending said valve member (40).
33. The inhalation therapy device according to claim 31 or 32, characterized in that said valve seat (22) has a curved, rounded or sloping design so as to bend said valve member (40) positioned on said valve seat to produce the pre-tension.
34. The inhalation therapy device according to one of claims 23 to 33, characterized in that said movable portion (20), in particular on a or said lid, can be locked in a closed state by means of at least one snap connection (32, 33).
35. The inhalation therapy device according to one of claims 23 to 34, characterized in that the parts valve seat (22), valve member (40) and movable portion (20) or stationary part (10) are injection-moulded as a single part from different materials.
36. The inhalation therapy device according to one of claims 23 to 35, characterized in that the parts valve seat (22), valve member (40) and/or movable portion (20) or stationary part (10) are produced in a two-component injection-moulding process.
37. The inhalation therapy device according to one of claims 23 to 36, characterized in that said valve

member (40) is essentially made of a softer material than said valve seat (22).

38. The inhalation therapy device according to one of claims 23 to 37, characterized in that said valve member (40) is essentially made of silicone rubber or thermoplastic elastomer.
39. The inhalation therapy device according to one of claims 23 to 36, characterized in that said valve member (40) is essentially made of a harder material than said valve seat (22).
40. The inhalation therapy device according to one of claims 23 to 39, characterized in that said valve seat (22) comprises a circumferential sealing lip (21).
41. The inhalation therapy device according to one of claims 23 to 40, characterized in that said valve (7) is an inhalation valve or an exhalation valve.